

Lloyd's Tercentenary Research Foundation

Role of Coastal Habitats in Managing Natural Hazards

Partnering with the Insurance Industry to Champion Natural Defences

Thanks to support from the Lloyd's Tercentenary Research Foundation, The Nature Conservancy is working with key partners in the risk and insurance sector to examine the role of coastal habitats as natural storm defences.

Flooding from storms causes significant economic damage. As coastal populations grow and sea levels rise, the risks to coastal communities will increase. Scientific evidence shows that many [coastal habitats](#), including [mangroves](#), [coral reefs](#) and [salt marshes](#) help protect coastlines by absorbing wave energy and reducing flooding and erosion. Under favorable conditions, these nature based defenses can keep pace with changing environmental conditions and rising sea levels. In contrast, gray infrastructure, such as sea walls and levees, can be costly, rarely keeps up with environmental change, and often damages nearby shorelines and habitats.

There is growing interest in the use of nature based defenses for building coastal resilience. The Nature Conservancy, with support from the Lloyd's Tercentenary Research Foundation, is working with key partners in the risk and insurance sector to examine the role of coastal habitats



as natural storm defenses. With the expertise from its team of engineers, risk modellers, ecologists and economists, we can explore when, where and how natural defences are most effective at reducing risk and what opportunities exist to fund the conservation and restoration of coastal habitats for risk reduction.

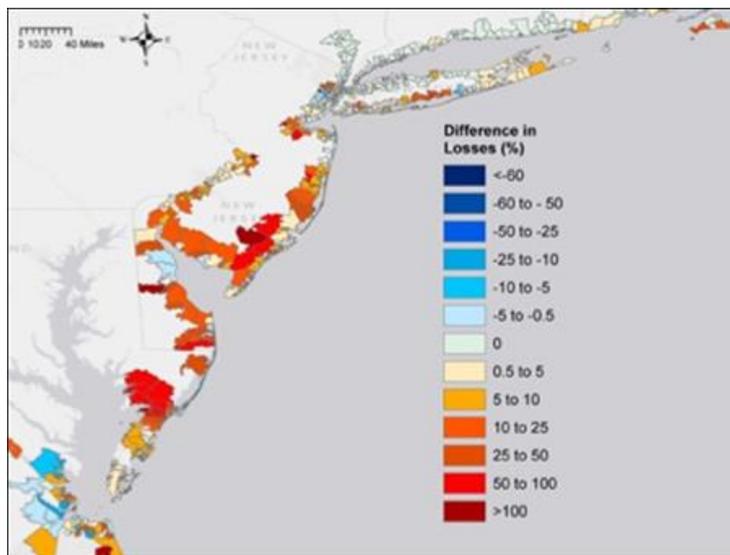
Wetland and mangrove habitats in Punta Gorda, Florida protect people and property from coastal hazards. ©Carlton Ward Jr.

The Value of Coastal Wetlands for Reducing Property Damage

A team of scientists at the [University of California Santa Cruz](#), [The Nature Conservancy](#), [Wildlife Conservation Society](#), [Risk Management Solutions](#), and [Guy Carpenter](#) asked the question: 'do salt marshes have an effect on storm damages to property?' The team modelled storm surge and damages from Superstorm Sandy in Risk Management Solutions' North Atlantic Hurricane Model. In October 2016, the team produced the report '[Coastal Wetlands and Flood Damage Reduction: Using Risk Industry-based Models to Assess Natural Defenses in the Northeastern US](#)'. The report put a dollar value on the risk reduction benefits provided by coastal wetlands in the North East United States.

Coastal wetlands prevented more than US\$625 million in property damages during Superstorm Sandy. On average, wetlands in the northeast can reduce property damages from storms and flooding by 20%. The research finds that the benefits of wetland conservation accumulate upstream: places with few wetlands within their boundaries benefited from the cumulative surge reduction of wetlands downstream.

The team also examined the annual benefits of wetlands in Ocean County, New Jersey and found that areas behind existing salt marshes have 16% fewer property losses when compared to areas that have lost their salt marshes. Properties built on previously existing wetlands, and properties at low elevations, face the greatest risk from flooding and therefore derive the greatest protection benefits from coastal wetlands.



Coastal Wetlands Protected People and Property during Superstorm Sandy. Using risk industry loss models, the research team predicted how the flood losses from Superstorm Sandy would change if our present wetlands were lost. The red areas on the map received the greatest protection.

This work is one of the few existing assessments of the economic costs

and benefits of the role of coastal wetlands in reducing flood damage to property. The report shows that coastal wetlands can reduce property damage from storms, and that these protection benefits can be readily incorporated and accounted for in the insurance industry's risk models.

More information: read [the report](#) and its accompanying [fact sheet](#), see a [video of the findings](#), and [read a blog](#) by the project's Post-doctoral Scholar.

Financing Natural Infrastructure

Despite growing interest in the use of nature based defenses to build coastal resilience, we spend [thirty times more](#) on building and maintaining gray infrastructure, such as seawalls, than we do on building and restoring natural infrastructure such as reefs and wetlands. A team of scientists at the [Center for the Blue Economy](#) of the Middlebury Institute of International Studies at Monterey, [The Nature Conservancy](#) and the [University of California, Santa Cruz](#) seeks to change this.

The report '[Financing Natural Infrastructure for Coastal Flood Damage Reduction](#)' reviews new and emerging funding opportunities for natural defenses. It also identifies the barriers that prevent the broader funding of natural defenses, and proposes a framework that helps identify when and where there may be opportunities to finance natural infrastructure.

The report has good news: there is a large and growing pool of financial tools that could fund natural infrastructure, with wins for both flood risk reduction and conservation. For example, in the United States the same tools that fund gray infrastructure, such as special purpose tax districts and

FEMA flood mitigation funding, may be applied to natural solutions. In addition to more well known programs for post-disaster funding (e.g. Mexico's FONDEN and US's FEMA), forward looking policies have begun to encourage pre-disaster spending and many of these newer policies fully support the use of natural infrastructure for risk reduction (e.g. the Philippines National Greening Program supports mangrove restoration for risk reduction). As more natural



Wetlands can protect built infrastructure by reducing flooding and erosion. @WBCSD

infrastructure projects are implemented, and as a skilled body of practitioners develops project experience and standards, the existing biases in favor of spending on disaster recovery instead of risk reduction, and on gray structures instead of natural infrastructure, will be reduced.

More information: read the [report](#) and its accompanying [fact sheet](#).